RIVERS AND FLOODS, MARCH, 1912

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The month of March was remarkable for the wide extent of territory covered by floods. Practically all streams east of the Rocky Mountains were in flood, except those along the immediate eastern slope of the mountains and in the northern and eastern Great Lakes region. The immediate causes were a marked excess of precipitation, ranging from 2 to 4 inches, and a continuance of the low temperatures of the winter, the ground remaining frozen to such an extent that the run-off from the precipitation was much greater than the usual amount. There were, of course, some floods resulting from the breaking of the ice, but these were confined to the northern tier of States and were not of great importance. The great majority were due to heavy rains from five storms of the southwest type, assisted during the latter part of the month by some heavy fresh snows in eastern Kansas, Missouri, and portions of Iowa. The later storms were accompanied by high temperatures that rapidly melted the snows, and there was also a sixth southwest storm during the first two days of April.

The Mississippi and lower Ohio floods continued at the close of the month with every prospect that they would reach the highest stages ever recorded before the decline set in. Reports on these floods will appear later, either in the Monthly Weather Review or in a special bulletin. Detailed reports regarding the floods in other rivers will be found in other portions of this Review. The aggregate losses were large, but they were offset to a considerable extent by the value of the property saved as a result of the Weather Bureau warnings, which maintained their usual reputation for timeliness and accuracy. It was difficult to obtain any accurate statements regarding the losses from the floods. Incomplete reports place the estimated value of property destroyed or damaged, exclusive of that caused by the Mississippi and lower Ohio floods, at $1,945,750, but it was probably nearly twice as much. The value of property saved so far as reported was $1,513,000. No estimates were obtained from a number of districts, but it is probable that the correct values are not far from $2,000,000.

ICE.

The ice moved out of the Mississippi River at Keokuk on the 17th, but remained frozen above, except at a few places where it moved out during the last few days of the month. The ice at the Wabash Bridge at Hannibal, Mo., broke on the 18th, and that from the gorge in the Des Moines River at Gregory, Mo., reached Hannibal early in the morning of the 27th, passing St. Louis on the 29th. The Missouri River was generally clear of ice by the end of the month, although remaining closed at a few places. The rivers of northern New England and northern New York opened about the middle of the month.

SNOW.

South Dakota.—The snowfall for the month was about double that of the previous month, and at the end of the month the snow in the gulches and timber was melting slowly, indicating an ample water supply for irrigation and other purposes.

Montana.—Cold and stormy weather with heavy snows during the first half of the month, followed by warm, sunny days and freezing nights, created favorable conditions for snow storage. The increase in depth during the month in the mountain ranges amounted to from 20 to 30 per cent, and it is now apparent, considering the extremely solid condition of the snow, and the unusual amount of moisture retained in the soil from the autumn rains, that an abundant flow of water is assured for most of the streams.

Wyoming.—Conditions continued to improve except over the Big Horn watershed, which will probably be the only portion of the State where the water supply will not be abundant. Over the remainder of the State the snow is deep and well packed, and the water should last until late in the season.

Colorado.—The month was stormy with unusually heavy snowfall, and at the end of the month the depth of snow was considerably greater than in March, 1911. Melting will be rapid.

New Mexico.—An improvement in conditions was noted, although the water supply will be somewhat deficient unless there are more good rains to supplement those that fell during the month.

Utah.—Although the snow is loose and in poor condition for late preservation, an improvement in general conditions was noted as the soil is unfrozen, and reported to be well saturated with moisture. Over the watershed of Great Salt Lake the water supply is greater than usual for this time of the year, but rather less over other watersheds.

Nevada.—Conditions continue unfavorable with every indication of a marked deficiency in the supply of water.

Idaho.—Owing to low temperatures there was but little snow melting, and more than the usual quantity remained in the mountains. The snow is compact with a high water content, indicating slow melting and a fair supply of water.

Washington.—While the precipitation for the month was deficient, the total snowfall for the season is considered near or above the average except along the Cascades.

Oregon.—Owing to the comparatively mild winter, the snow settled gradually into a compact mass insuring slow melting and a gradual run-off. The soil is also in good condition, and there are prospects of a late flow of water in excess of the normal amount.

California.—The season has been of the driest known, and at the end of the month there were but 4 feet of

snow at the 7,000-foot level. Present indications favor a deficient water supply, but April snows and rains may result in some improvement.

An interesting and valuable feature of snow measurement was the intensive work carried on for the second season over the watershed of Maple Creek, Utah, under the supervision of the official in charge of the local office of the Weather Bureau at Salt Lake City, Utah. The actual work during March of this year was performed by Mr. J. Cecil Alter of the Salt Lake City office. The entire watershed was thoroughly surveyed during March, 1911, and 2,000 soundings and 277 measurements made with the Marvin density apparatus. There were about 4,000 acres of snow, about 3 feet in depth, with a water equivalent of 11.5 inches, or 32 per cent. This year there were 4,500 acres of snow in appreciable amount, with average depth of 42.5 inches, but the water equivalent was only 10.1 inches, or 24 per cent, indicating about 12 per cent less water this year than last. The total number of measurements made this year was 297. Messrs. Thiessen and Alter were the pioneers in this work. Its practical value has already been recognized throughout the State of Utah, and its extension to other fields is only a question of time and expense.

Hydrographs for typical points on several principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.